

whole of the precipitation takes place during the summer months. Heavy falls at the beginning or end of the year would entirely throw the calculation out, as was shown by Mr. Watt in the issue of April 14. In countries such as England and Scotland, where the rain is fairly evenly distributed throughout the year, the centre of gravity, as determined by Mr. Cook, will nearly always lie between 6 and 7, although its true position may be anywhere from 0 to 12.

If the monthly rainfalls be plotted round a disc arranged like a clock-face, and then the moments be calculated about rectangular axes passing through the centre of the disc, a series of simple calculations gives the true position of the centre of gravity.

It is best defined by means of an angle, α , measured clockwise from XII, and a distance, a , expressed as a fraction of the radius. The latter is a measure of the unevenness of the distribution of the rainfall. If equally distributed throughout the year, $a=0$; if very unequally distributed, a approaches 1. If the angle α be divided by 30° , a figure is obtained corresponding to Mr. Cook's C.G. But as the true position of the monthly rainfall is at the middle and not the end of the month, 0.5 must be deducted from this figure to obtain D, the date in months corresponding to the true centre of gravity. Mr. Cook omitted to make this correction.

In the tables below this method has been applied to two stations in southern India, selected at random:—

Bangalore.

Month	Mean rainfall inches	Moment about horizontal axis	Moment about vertical axis	Moment by Cook's method
I	0.06	0.05	0.03	0.06
II	0.22	0.11	0.19	0.44
III	0.72	0	0.72	2.16
IV	1.19	-0.60	1.03	4.76
V	4.53	-3.92	2.26	22.65
VI	3.13	-3.13	0	18.78
VII	4.13	-3.58	-2.06	28.91
VIII	6.00	-3.00	-5.20	48.00
IX	7.11	0	-7.11	63.99
X	6.74	3.37	-5.84	67.74
XI	2.61	2.26	-1.30	28.71
XII	0.39	0.39	0	4.68
Year	36.83	-8.05	-17.28	290.88
a		0.513		
α		245°		
D		7.67	(August 20)	
"C.G."				7.90
"C.G." corrected				7.40

Kolar.

Month	Mean rainfall inches	Moment about horizontal axis	Moment about vertical axis	Moment by Cook's method
I	0.16	0.14	0.08	0.16
II	0.04	0.02	0.04	0.08
III	0.50	0	0.50	1.50
IV	1.32	-0.66	1.15	5.28
V	3.34	-2.90	1.67	16.70
VI	3.13	-3.13	0	18.78
VII	3.36	-2.91	-1.68	23.52
VIII	4.16	-2.08	-3.61	33.28
IX	5.10	0	-5.10	45.90
X	5.50	2.75	-4.77	55.00
XI	3.17	2.75	-1.58	34.87
XII	0.81	0.81	0	9.72
Year	30.59	-5.21	-13.30	244.79
a		0.467		
α		248°		
D		7.78	(August 23)	
"C.G."				8.00
"C.G." corrected				7.50

It will be seen that the results are not very different from those obtained by Mr. Cook's method, and the difference is constant, at any rate for these two stations (0.28 , 0.27). But for English stations very different results would be obtained. The constants have also been calculated for the three imaginary cases suggested by Mr. Watt:—

	A in.	B in.	C in.
I	3	0	12
II	3	0	4
III	3	0	2
IV	3	6	0
V	3	6	0
VI	3	6	0
VII	3	6	0
VIII	3	6	0
IX	3	6	0
X	3	0	2
XI	3	0	4
XII	3	0	12
Year	36	36	36
"C.G."	6.5	6.5	6.5
D	—	6.0	0
a	0	0.644	0.830

It will be seen that D and a , together with the total rainfall for the year, entirely define the distribution, whereas the "C.G." calculated by Mr. Cook's method throws no light upon it.

This method of specific gravities can, of course, be used for other annual statistics, such as barometric pressures and temperatures. In the latter case, the figures for a would depend upon the zero of temperature selected, and would consequently be different for the Centigrade and Fahrenheit scales. It would perhaps be more satisfactory to take the mean annual temperature of the station as zero. The figures for D would not be affected by the choice of scale.

The applicability of the method is not confined to meteorology, but may be used for any phenomenon which varies with the time of the year, e.g. vital statistics or railway receipts.

A. MARSHALL.

Waverley Cottage, Naini Tal, India, June 14.

Present Meteoric Displays.

THE Perseid shower appears to have come into play rather earlier than usual this year, for I saw four meteors presumably directed from it on the nights of July 11 to 13. These meteors were of the usual streaking class, and formed a radiant at about $16^\circ + 50^\circ$, which agrees fairly well with the correct place of radiation at the end of the second week in July. This year I found meteors decidedly rare at the epoch named, but the skies were not very favourable, and twilight very strong.

By the time these lines appear in print the moon will only slightly interfere with observation, and a clear sky will show many meteors, for at the end of July the Aquarids, as well as Perseids, are generally plentiful; and there is no danger of confusing the members of the two streams, since their radiants are widely distant from each other. The Aquarids shoot slowly upwards in long flights from a radiant low in the southern sky, while the Perseids are directed in rapid courses from a radiant in the N.N.E.

On July 29–31 an observer may generally expect to see at least twenty meteors per hour, and especially after midnight, when the number visible usually exhibits a very marked increase, the radiants of both the Perseids and Aquarids taking up a more favourable position for the distribution of their meteors as the night advances.

It is to be hoped that all the brighter meteors and bolides will be individually recorded this year. The stars of Draco, Cassiopeia, Cepheus, Andromeda, Pegasus, Cygnus, and other constellations afford a ready guide for the accurate registry of meteor-flights, and such data will possess an enduring value as a means of furthering our knowledge.

W. F. DENNING.

Pwdre Ser.

THE following letter, which I received last winter, may possibly throw some light on the questions raised by Prof. Hughes in his paper on "Pwdre Ser" in NATURE of June 23:—

"Allegheny, December 4, 1909.

"DEAR PROFESSOR SCHLESINGER,—

"Referring to the falling meteor of which my husband made mention at your lecture last evening, the facts are

as follows. One evening some years since my father, Mr. Joel Powers, while walking on Lawrence St., Lowell, Massachusetts, saw a brilliant shooting star or meteor flash downward through the atmosphere, striking the earth quite near him. He found it upon investigation to be a jelly-like mass, and almost intolerably offensive in smell. I have often heard my father allude to this event, which greatly interested him, he being a close observer and an extensive reader.

"Respectfully yours,
"ELLEN M. ADAMS."

While I am of the opinion that the mass found by Mr. Powers had no connection with the meteor that he saw, it may be well to put this piece of evidence on record in view of Prof. Hughes's paper.

FRANK SCHLESINGER.

Allegheny Observatory, July 12.

THE ETHNOLOGY, BOTANY, GEOLOGY, AND METEOROLOGY OF GERMAN AFRICA.¹

SOME time ago, reviewing a scientific treatise on German South-west Africa and the adjoining regions I ventured to make the remark in this journal that Germany deserved to be allowed to take under her control still more of the undeveloped portions of the earth's surface, provided she continued by the direct action of her Government to enrich the world's store of knowledge as she has been doing with her African and New Guinea researches during the last ten years. The present "Mitteilungen" support this exordium; they are of high scientific value.

There is, firstly, a separate volume by Dr. Weule on his ethnographical observations in the south-east parts of German East Africa. Here, for the modest sum of three shillings (three marks), one gets a splendidly illustrated work of first-rate importance on a section of Bantu Africa. "Ergänzungsheft Nr. 2" is a dissertation by Prof. Dr. Carl Uhlig on the cartography of the German portion of the Rift Valley region of equatorial East Africa, with an appendix on the orthography of place-names in Masailand, &c., by Dr. Bernhard Struck. Part i. of Band xxii. deals with the journeys in 1905-6 of Franz Seiner in the still very little explored country between the Kalahari Desert and the Upper Zambezi (especially the valleys of the Okavango, Kwando, and Omuramba rivers); part ii., with the glaciers of Kilimanjaro, the rainfall and meteorology of the Cameroons and of German South-west Africa; part iii., likewise with the exploration of the upper parts of Kilimanjaro, the rainfall of Togoland, and the geography of Ponape Island; and part iv., with the volcanoes recently active on the Cameroons Mountains, the rainfall and meteorology of the Cameroons and of the Logone River (Shari district), the Paresis Mountains of South-west Africa, and the meteorology of the German possessions in the Pacific. The space, however, which is attributed in this collection to the German oceanic territories is so small that no further allusion to them need be made (other than to praise very cordially the extremely interesting map of Ponape Island in the Carolines Protectorate), and we might proceed at once to discuss the valuable additions to our knowledge of Africa contained in these six sections of the scientific reports attached to the Deutschen Kolonialblatte.

Dr. Weule's work in East African anthropology has already been made known to English readers by Miss Alice Werner in a translation of his more "popular" account of his travels and in various papers in the *Journal of the (British) African Society*. It was re-

marked in one or other of these publications that Dr. Weule's work was a little impaired by his apparent unacquaintance with his subject before embarking on this expedition to East Africa. Had he studied more the numerous works in German and in English dealing with the native tribes of the southern portions of German East Africa and of British Nyasaland, he would have avoided a certain *naïveté* of discovering what had already been made known and a few blunders into which he had fallen through a lack of comparative knowledge; also that his orthography of native names was a little old-fashioned (in its German rendering) and divergent from the methods of spelling adopted long ago by German and British philologists and travellers.

These criticisms are less applicable to the volume under notice, "Wissenschaftliche ergebnisse meiner ethnographischen Forschungsreise in den südosten Deutsch-Ostafrikas"; though the orthography still irritates and the many painstaking quotations of native speech in the dialects of Yao and Makua would have been the better for careful revision with German or British experts. (They tend to incorporate too much the Swahili words of some intervening interpreter.) But the greater part of this book is interesting and valuable to the ethnologist. The illustrations which accompany it are deserving of unstinted praise. Photographically (for the most part) and by clever draughtsmanship, Dr. Weule depicts the physical types of the Wa-mwera, A-makua, Wa-yao, Wa-makonde, Wa-matambwe, and Wa-ngoni peoples of the Ruvuma basin; their costumes, ornaments, and hideous self-inflicted deformities (such as the monstrous "pelele," or lip-disc, worn by nearly all the women in this region); their houses and methods of building; their graves, fetish-huts, granaries, cooking arrangements, doors, wooden locks and keys, pottery-making, metal-work, bark-cloth felting, basket- and mat-making, salt-straining; their weaving of cotton cloth and remarkable wood carving and calabash engraving. Indeed, he reveals a new chapter in negro art by his illustrations of their statues in wood, their clay dolls, their sculptured birds, Rhynchocyon insectivores, pigs, monkeys, and dogs; their most artistic carved snuff-boxes, amulets, powder-boxes, spoons, and stools. (As regards the last it is interesting to note the striking resemblance in shape and design to those of the south-eastern basin of the Congo.) One arises from this survey (and after reading the accompanying text) convinced that with due encouragement some section of the negro race is going to astonish the world yet in design and sculpture.

Then there are the extraordinarily ingenious traps, snares, and pitfalls, all most clearly and yet picturesquely illustrated. Elephants are sometimes killed by the falling of a heavily-weighted harpoon from a lofty tree-branch or scaffold which they release by the displacing of a cord; the larger antelopes similarly discharge arrows or assagais into their own bodies; the smaller quadrupeds dislodge in their passage a heavy beam which falls and crushes them. There are springes and nooses for the capture and strangling of beasts and birds, and cages for catching them alive; rat-traps and hyena-traps. All these display an ingenuity, a neat-handedness, and an unconscious knowledge of dynamics very remarkable in people still living ostensibly as semi-savages. One realises in studying Dr. Weule's work how it was that, although the fossil remains of *Homo primigenius*—and the negro stands higher as a subspecies of *Homo sapiens*—exhibit an osteology approximating slightly to the anthropoid apes, yet the brain capacity of any type of the genus *Homo* is almost of necessity an average

¹ Mitteilungen aus den Deutschen Schutzgebieten, &c. Ergänzungsheften Nr. 1, pp. x+150+Tafel 63; und 2, pp. iv+62. Hefen i. bis iv., Band xxii. Edited by Dr. Freiherr von Danckelmann. (Berlin: Ernst Siegfried Mittler und Sohn, 1909.) Price 3 marks each.